Energy

3.3.1 Outline the range of energy resources available to society.

3.3.2 Evaluate the advantages and disadvantages of two contrasting energy sources.

Renewable Energy Sources

Energy Source	Description of Energy	Advantages	Disadvantages
WIND	Wind (caused by Solar E) Caused turbines to turn which turns a generator.	• low pollution (due to manufacture) • Similar $ to termal pwr. • Can graze animals underneath.	• Visual + noise pollution ↳ Stress. • hazard to wildlife (bats + birds) • need lots of wind + correct topography.
HYDRO	Water moving down (due to pumps or gravity) Cause turbines to turn which turns a Generator	• Low amounts of air pollutants (some from decomp. plants) • Provides reservoirs for fishing + recreation.	• Need enough precipitation • Displaces ecol. + Human populations •
GEOTHERMAL	Water pumped into underground pipes. Geothermal heat heats pipes. Water pumped back to house	• Continuous supply possible • low air pollution • Costs ↓ in long term.	• Req. specialist training + equip. • Setup will be expensive • Only suitable in certain locations.
SOLAR	Solar E collected by Photovoltaic cells.	• Cont. supply • easy to make E via PV cells. • can be used directly	• large seasonal + latitudinal variations • ↑ Land needed to get lots of E • Expensive setup.
BIOMASS	Burning plant material or algae to make E. (ultimately Solar energy)	• often traditional fuel • CO_2 neutral (sometimes) • Habitat for wildlife	• dest. of nat. habitat • ↑ irrigation needs • Competes w/ food supplies.

Non-Renewable Energy Sources

Energy Source	Description of Energy	Advantages	Disadvantages
OIL	created by preasurized dead organisms (long time) → burn → Heat H_2O → Steam → generator	• very versatile • Easy to transport • High E content against mass	• Rising costs • Air pollution: CO_2 + NOx • Located in only a few countries • Peak production near or pass.
COAL	Created by preasurized dead plants (takes a long time to make) → Burn → Heat H_2O → Steam → turns generator	• will last longer than coal. • Cheaper than oil • easy to build pwr. plants near mines for cheap E	• Air pollution → particulates + SOx + CO_2 • LOTS of issues w/ combustion • Bulky + hard to transport
NATURAL GAS	Created as coal + oil are made. → Burn → Heat H_2O → steam → turns generator	• Versatile • cheaper than oil • Fair E content against mass. • Low emissions once combusted.	• inflammable • non-renewable • Impact of mining + pipelines • Pollution to groundwater.
NUCLEAR	• Split uranium atoms → heat H_2O → turn turbine → generator.	• doesn't produce CO_2 • Requires small quantities of fuel • ↑ of electricity easily made.	• Limited supplies of fuel (uranium) • LOTS of issues w/ Radioactive Wastes • Risk of "meltdown"

3.3.3 Discuss the factors that affects the choice of energy sources adopted by different societies.

Availability

- Is the resource located within the country?
- Is the topography within the country ideal for the type of energy?
- Is the location of the country (mountain, rivers) ideal for the type of energy?

Coal/Oil/Nat. Gas found in diff. amounts in various parts of world.

Mountains/Big Plains → good for wind

Valleys w/ Rivers → Hydro.
thin crust → geo.

On coast → wind/wave E
Near volcanoes → geo.
Near rivers → hydro.
Earthquake prone? Nuclear poor choice.

Economic

- Is there a high standard of living that impacts energy choice?
- Is there high technological development that impact energy choice?
- Is the country wealthy? Does this impact the energy choice?

generally Higher Standard of living means communities need more E.
→ They are also likely to think about their E choice.

Wealthy = use lots of E
But may also be able to make decisions about type of E they are using. (@ a personal level)

Is the country trying to develop quickly? If so → Fast + Cheap is the most important.

Cultural

- Does this country have any strong historical traditions that impact energy choice?
- Does this country have any value systems that impact energy choice?
- Have there been any historical events (nuclear disasters, oil embargoes) that impact energy choice?

ie. Places where windmills have been used for a long time are more likely to switch to wind.

Does the Country care about the Environment (Costa Rica) OR not?
(UAE, Middle Eastern Countries)

Nuclear Disasters (like Fukishima) may ↓ Nuclear.

Political

- Has policy changed because environmental values changed in the population (becoming more ecocentric or more anthropocentric)?
- Does this country need to meet any international agreements (Kyoto protocol etc)

Countries like the US + Australia who started w/ enviro-centered indiginous people, But now those countries are more anthro/tech. centric

Trying to Meet Kyoto Protocal, Montreal Protocol, CITES.